Where Are We Going and Can the "Smart Grid" Get Us There?

REFF-WEST
ACORE
"Smart Grid"
Session 4
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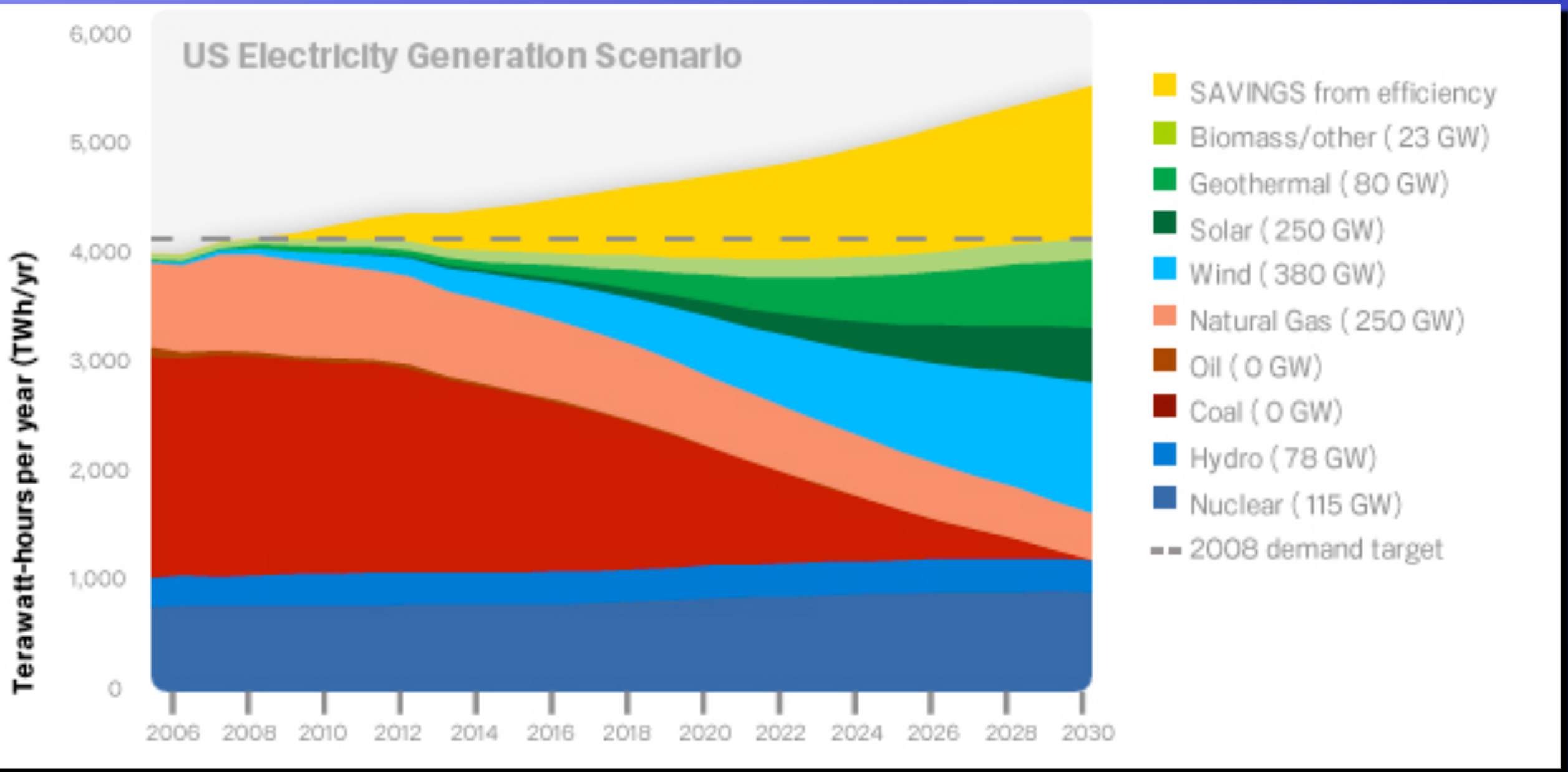
Commissioner
FERC

Where Do We Want to Be in 2030?
The Google Energy Plan



What is the "Smart Grid"?

The Smart House

Xcel Energy's Smart Grid Consortium is imagining a future that would allow you to communicate your energy choices to the power grid and automatically receive electricity based on your personal needs.

Xcel Energy®

TWO-WAY FLOW OF INFORMATION AND POWER

The potential benefits:

- Lower cost of power
- Cleaner power
- A more efficient and resilient grid
- Improved system reliability
- Increased conservation and energy efficiency

Plug-in Hybrid Electric Car

Xcel Energy is studying how plug-in electric vehicles can store energy, act as backup generators for homes and supplement the grid during peak hours.

Smart Meter

Real-time pricing signals create increased options for consumers.

Smart Appliances

Smart appliances contain on-board intelligence that "talks" to the grid, senses grid conditions and automatically turns devices on and off as needed.

Smart Thermostat

Customers can opt to use a smart thermostat, which can communicate with the grid and adjust device settings to help optimize load management. Other "smart devices" could control your air conditioner or pool pump.

High-Speed Connections

Advanced sensors distributed throughout the grid and a high-speed communications network tie the entire system together.

Customer Choice

Customers may be offered an opportunity to choose the type and amount of energy they'd like to receive with just the click of a mouse on their computer.

100 percent green power? A mix of sources? The cheapest priced source? In Smart Grid City, it could be up to you.

"Smart Grid" Benefits- AMI

- **Reduced Billing and Customer Service Costs**
  - **Meter Reading Efficiency – *50% Savings***
  - **Reduced O&M Impacts at Call Center**
  - **Recovery of Lost Revenue & Reduced Costs Associated with Theft Investigation**
  - **Remote Disconnects/Reconnects**
- **Enable DR, EE and DG with Monitoring and Measurement and Verification**

"Smart Grid" Benefits- T&D

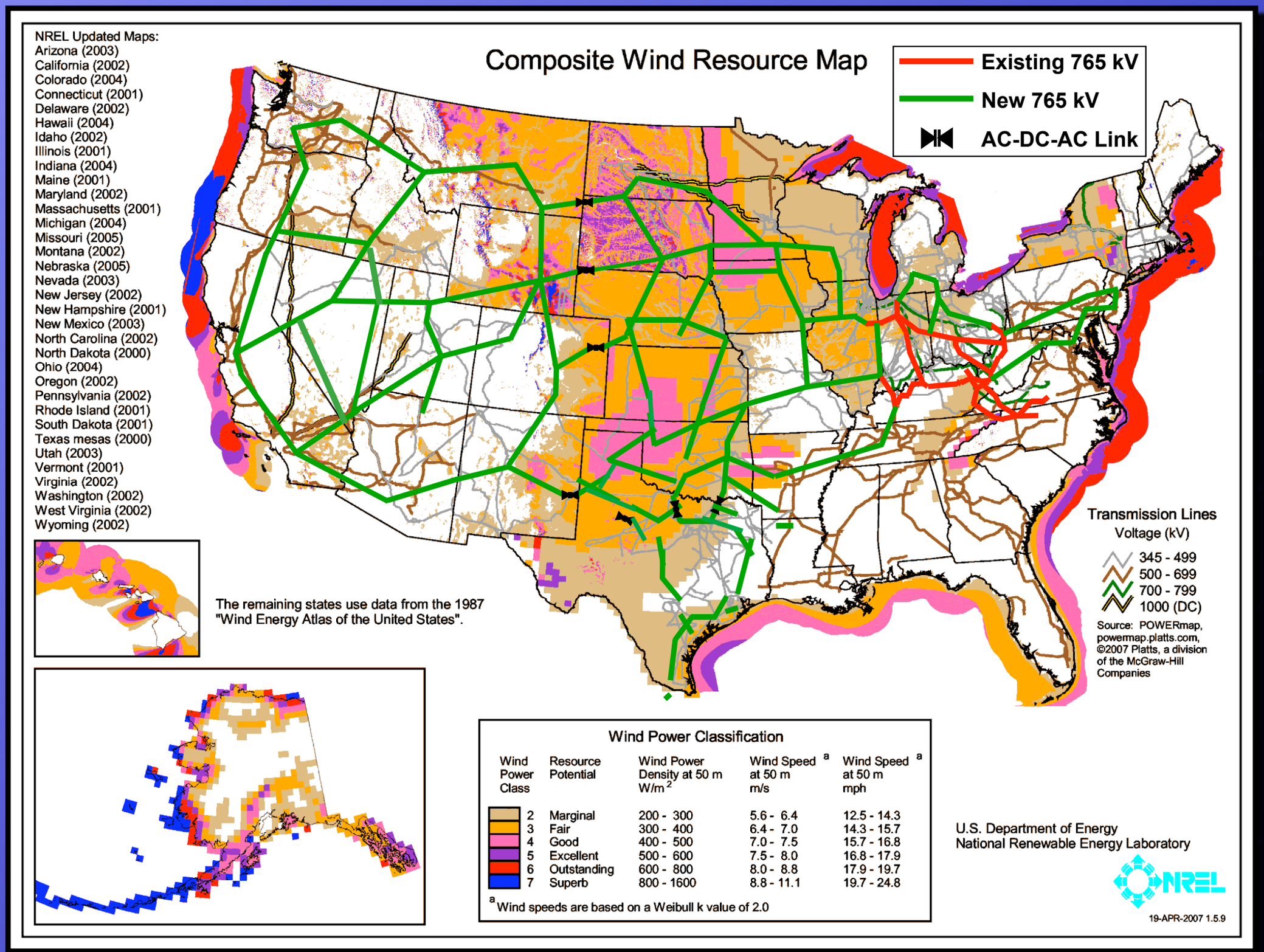
- **Reduced T&D Losses & Optimize Operations**
  - **Remote Operation of Capacitor Banks to Reduce Reactive Power Needs**
  - **Remote Sensing of Customer Power Factor at Distribution Transformer**
  - **Distribution Automation for Load Balancing**
  - **Control & Aggregation of Distributed Generation/ Distributed Energy Resources**
  - **Dynamic Line & Transformer Loading**

"Smart Grid" Benefits- System Optimization

- **Equipment & Operations Optimization**
  - **Avoiding System Failures by Proactively Replacing Cables, Substation Equipment & Transformers**
  - **Dynamically Rating Transformers Defer Capital Investments**
  - **Extending Generation Asset Life**
  - **Reduced Reserve Requirements/ Fewer Peakers**
  - **More Efficient Operation of Existing Units**
  - **Ancillary Services from Distributed Resources Instead of Generators**
  - **Lower Cost Integration of Renewables**

Existing HV Grid

Intelligent HV Backbone Grid



Why Should Investment Dollars Go To The "Smart Grid"?

- **All Capital Competes**
  - **Renewable $ vs. "Smart Grid" $ vs. Clean Coal $ vs. Nuclear $**
- **Do Most Efficient (& Necessary) Things First**
  - **Get Price Signals and Data to Consumers (Do AMI)**
  - **Deploy EE & DR & DG**
  - **Organize Regions**
    - **Transmission Planning & Cost Allocation**
    - **Build Intelligent Grid Backbone**
    - **Allow for EE, DR, DG to Provide Grid Services**

The Competition for Capital

Utilities Seek $122 Billion in Nuclear Loan Support

By Daniel Whitten

Oct. 2 (Bloomberg) -- **Southern Co.**, **PPL Corp.** and **Duke Energy Corp.** are among 17 utilities seeking $122 billion in loan guarantees from a U.S. Energy Department program that makes available $18.5 billion to build nuclear plants.

Power companies that submitted 21 separate applications for the guarantees, the department said in an e- mail today. Spokeswoman Bethany Shively said the department isn't naming the utilities.

The industry has complained that the $18.5 billion isn't enough to jumpstart a so-called nuclear renaissance, saying that amount could help support three reactors at the most. The program, mandated under a 2005 law, has been mired in funding disputes and delays. It's intended to offer financing support for clean-energy projects that otherwise might not be built.

``It appears to be oversubscribed,'' said **Richard Myers**, vice president of policy development at the Nuclear Energy Institute, the industry's Washington-based trade group. ``Clearly $18.5 billion is not adequate to provide the financing support necessary.''

17 Utilities Seek $121 Billion or $7.1 Billion Each

Deploy

Baby

Deploy!